FIELD HYDRAULIC CONDUCTIVITY TEST
AUGER HOLE METHOD

FOR DRAINAGE INVESTIGATIONS

Log Number ____________________

Estimated "HC" ____________________ Calculated "HC" ____________________

Location ____________________ Date ____________ Technician ____________

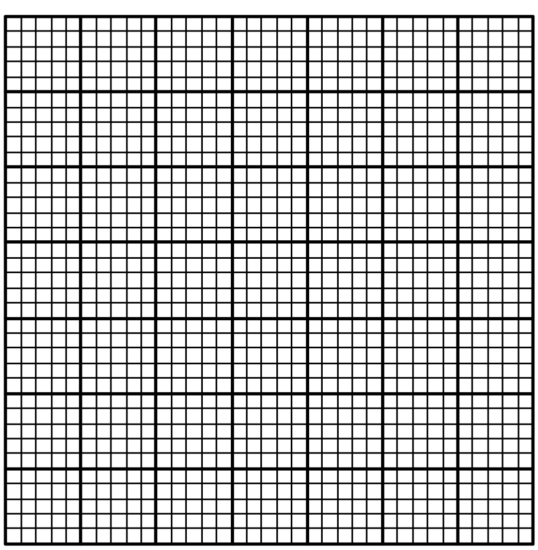
Auger Dia. ____________________ Depth Hole ____________________

Sloughing ____________________ Times Cleaned ____________________

pH (Soil ____________ Water ____________) Salinity (Soil ____________ Water ____________)

TIME	ELAPSED TIME	Δt	DISTANCE TO WATER SURFACE FROM REFERENCE POINT			Δh	RESIDUAL DRAWDOWN
			BEFORE PUMPING	AFTER PUMPING	DURING RECHARGING		
			B	A	R	A–R	R–B
	Minutes	Minutes	Feet	Feet	Feet	Feet	Feet

RESIDUAL DRAWDOWN (R–B) IN FEET



TIME IN MINUTES

COMMENTS

FIELD HYDRAULIC CONDUCTIVITY TEST
AUGER HOLE METHOD

A knowledge of in place soil permeability is very important in drainage design. Permeability is essential in the design of grids as well as interception drains.

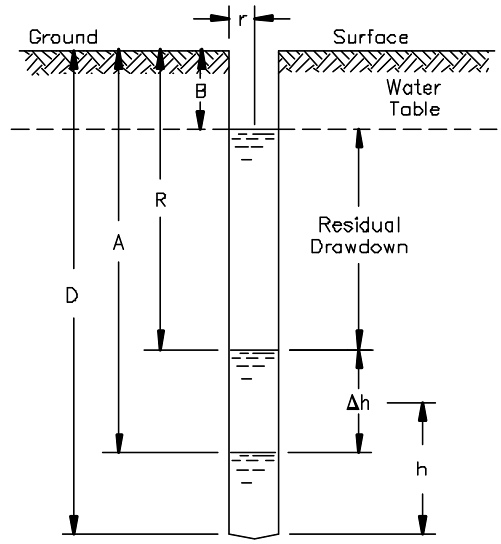
The auger hole method described below is a relatively simple test that can be made with a minimum of equipment and in conjunction with the soil profile investigation. The term hydraulic conductivity is a permeability figure dependent on properties of the groundwater, as well as the soil profile.

The drainage soil profile log holes are used for the permeability tests or a special hole can be augered for the purpose. The hole is pumped or bailed out several times to permit any puddled–over pores along the wall of the cavity to be flushed out by the inseeping groundwater. This flushing process can be accomplished with a pitcher pump or a bail bucket slightly smaller than the auger hole. A beer can attached to a broom handle makes a usable bail bucket. The water level in the auger hole is allowed to become static following the cleaning process.

TEST: The water level is lowered in the auger hole with the pump or bail bucket. The distance the water level is lowered will be dependent upon the caving and sloughing tendency of the profile. Where sloughing is a problem a smaller drawdown should be used and possibly a liner or screen will be required. The water levels and times of observation are recorded on the form. This time and distance of rise is used in the following Kirkham auger hole formula to calculate the hydraulic conductivity. The depth of water in the auger hole (D–B) should be about 5 to 10 times as deep as the diameter (2r) of the auger hole.

$$HC = 444 \times \frac{r}{Sd} \times \frac{\Delta h}{\Delta t}$$

HC – Hydraulic conductivity in inches per hour
r – Radius of auger hole in feet
S – Function from figure in this page
d – Depth of water in auger hole in feet (D–B)
Δh – Raise of water level in feet Δt timed interval (A–R)
Δt – Time required to give Δh in minutes
h – Average depth of water in auger hole during test (D–A + Δh/2)



Auger Hole Profile

r = ______________

d = ______________ HC = 444 x $\frac{\_\_\_\_}{\_\_\_\_}$ x $\frac{\_\_\_\_}{\_\_\_\_}$

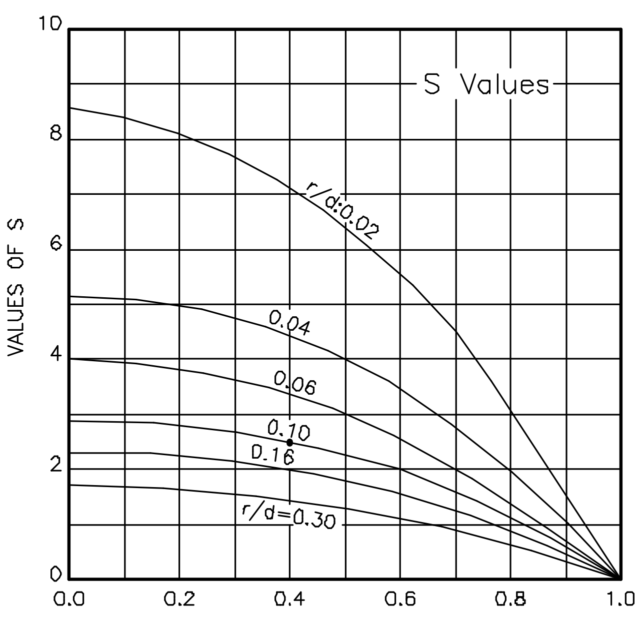
h = ______________

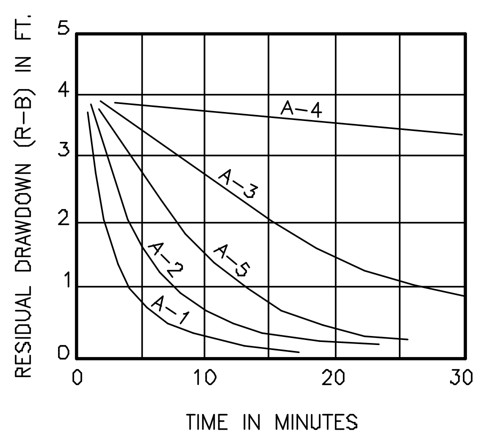
Δh = ______________ HC = ______________

Δt = ______________

r/d = ______________ = ______

h/d = ______________ = ______ S = ________





An estimate of the relative hydraulic conductivity between auger holes can be determined by plotting the residual drawdown at various recharge times. The slope of the curve gives an indication of hydraulic conductivity. The steeper the curve the higher the conductivity.